WE CLAIM:

1. An apparatus for producing a Bragg grating in an optical fiber, the apparatus comprising:

means for controlling a Ti:sapphire laser to produce an output laser beam having a wavelength in the range of approximately 230 to 250 nanometers; and

means for using the output laser beam to produce the Bragg grating in the optical fiber.

2. The apparatus of claim 1, wherein the controlling means comprises means for pumping the Ti:sapphire laser with a second harmonic pump beam.

3. The apparatus of claim 2, wherein the controlling means further comprises means for producing a third harmonic of a laser beam emitted by the Ti:sapphire laser.

4. The apparatus of claim 2, wherein the pumping means comprises:

active laser means;

second pumping means for pumping the active laser means; and

doubling means for doubling a fundamental frequency emitted by the active laser means.

5. The apparatus of claim 2, wherein the controlling means further comprises:

tripling means for generating a third harmonic beam from the second harmonic pump beam; and

means for mixing the third harmonic beam with a beam emitted by the Ti:sapphire laser.

6. The apparatus of claim 2, wherein the pumping means comprises a diode laser.

7. The apparatus of claim 3, further comprising:

first resonator means; and

second resonator means, wherein the Ti:sapphire laser is disposed within the first resonator means and at least a portion of the third harmonic means is disposed within the second resonator means.

8. The apparatus of claim 4, wherein the controlling means further comprises resonator means, and wherein the active laser means and the doubling means are disposed within the resonator means.

9. The apparatus of claim 5, wherein the controlling means further comprises first resonator means and second resonator means, and wherein the Ti:sapphire laser is disposed within the first resonator means and the tripling means is disposed within the second resonator means.

10. The apparatus of claim 6, wherein the controlling means further comprises third resonator means, wherein the third harmonic means further comprises frequency doubling means and frequency tripling means, and wherein the frequency doubling means is disposed within the second resonator means and the frequency tripling means is disposed within the third resonator means.

11. An apparatus for producing a Bragg grating in an optical waveguide, the apparatus comprising:

a solid state laser comprising a Ti:sapphire crystal for producing an output laser beam having a wavelength in the range of approximately 230 to 250 nanometers; and

a Bragg writer for using the output laser beam to produce the Bragg grating in the optical waveguide.

12. The apparatus of claim 11, wherein the solid state laser further comprises:

an active laser medium;

a pump for pumping the active laser medium to produce a fundamental beam; and

a first nonlinear crystal for producing a second harmonic pump beam from the fundamental beam, wherein the Ti:sapphire crystal is pumped by the second harmonic pump beam.

13. The apparatus of claim 12, wherein the solid state laser further comprises:

a second nonlinear crystal for producing a second harmonic beam from a fundamental beam emitted by the Ti:sapphire crystal; and

a third nonlinear crystal for producing a third harmonic beam by mixing the fundamental beam and the second harmonic beam.

14. The apparatus of claim 12, wherein the solid state laser further comprises:

a tripler crystal for generating a third harmonic beam from the second harmonic pump beam and the fundamental beam; and

a mixing crystal for mixing the third harmonic beam with a beam emitted by the Ti:sapphire crystal.

15. The apparatus of claim 12, wherein the pump comprises a diode laser.

16. The apparatus of claim 12, wherein the solid state laser further comprises a resonating cavity, and wherein the active laser medium and the first nonlinear crystal are disposed within the resonating cavity.

17. The apparatus of claim 13, wherein the solid state laser further comprises:

a first resonator; and

a second resonator, wherein the Ti:sapphire crystal is disposed within the first resonator and wherein the second nonlinear crystal is disposed within the second resonator.

18. The apparatus of claim 17, wherein the solid state laser further comprises a third resonating cavity, and third nonlinear crystal is disposed within the third resonating cavity.

19. A method for producing a Bragg grating in an optical waveguide, the method comprising:

pumping an active laser medium to generate a fundamental pump beam;

doubling a frequency of the fundamental pump beam to generate a second harmonic pump beam;

pumping a Ti:sapphire crystal with the second harmonic pump beam;

generating a third harmonic beam from the second harmonic pump beam, the third harmonic beam having a wavelength in the range of approximately 230 to 250 nanometers; and

using the third harmonic beam to produce the Bragg grating in the optical waveguide.

20. A method for producing a Bragg grating in an optical waveguide, the method comprising:

pumping an active laser medium to generate a fundamental pump beam;

doubling a frequency of the fundamental pump beam to generate a second harmonic pump beam;

pumping a Ti:sapphire crystal with the second harmonic pump beam;

generating a third harmonic beam from the second harmonic pump beam;

mixing the third harmonic beam with a beam emitted by the Ti:sapphire crystal to produce an output beam having a wavelength in the range of approximately 230 to 250 nanometers; and

using the output beam to produce the Bragg grating in the optical waveguide.

21. An apparatus for producing a Bragg grating in an optical waveguide, the apparatus comprising:

diode laser means for producing a third harmonic laser beam having a wavelength in the range of approximately 230 to 250 nanometers; and

means for using the third harmonic laser beam to produce the Bragg grating in the optical waveguide.

22. The apparatus of claim 21, wherein the diode laser means comprises a VCSEL.

23. The apparatus of claim 21, wherein the diode laser means emits a fundamental beam at approximately 720 nanometers.

24. The apparatus of claim 21, wherein the diode laser means comprises a diode laser bar.

25. An apparatus for producing a diffraction pattern in an optical fiber, the apparatus comprising:

a diode laser for producing a third harmonic laser beam having a wavelength in the range of approximately 230 to 250 nanometers; and

a Bragg writer for using the third harmonic laser beam to produce the diffraction pattern on the optical fiber.

26. The apparatus of claim 25, wherein the diode laser comprises a VCSEL.

27. The apparatus of claim 25, wherein the diode laser emits a fundamental beam at approximately 720 nanometers.

28. The apparatus of claim 25, wherein the diode laser comprises a diode laser bar.

29. An apparatus for producing a Bragg grating in an optical waveguide, the apparatus comprising:

a solid state laser comprising a Ti:sapphire laser medium, wherein the solid state laser emits an output beam having a wavelength in the range of approximately 230 to 250 nanometers; and

a phase mask interferometer for using the output beam to produce the Bragg grating in the optical waveguide.

30. The apparatus of claim 29, wherein the phase mask interferometer comprises:

a phase mask for diffracting rays from the output beam;

a first mirror; and

a second mirror, wherein the first mirror and the second mirror reflect a first ray and a second ray diffracted by the phase mask and cause the first and second rays to interfere with one another.

31. The apparatus of claim 29, wherein the phase mask interferometer comprises:

a phase mask for diffracting rays from the output beam; and

a block for refracting rays diffracted by the phase mask.

32. The apparatus of claim 29, wherein the phase mask interferometer comprises means for rotating the optical waveguide.

33. The apparatus of claim 30, further comprising means for translating at least one of the first mirror and the second mirror.

34. The apparatus of claim 30, further comprising means for rotating at least one of the first mirror and the second mirror.

35. An apparatus for producing a Bragg grating in an optical waveguide, the apparatus comprising:

a solid state laser comprising a Ti:sapphire laser medium, wherein the solid state laser emits an output beam having a wavelength in the range of approximately 230 to 250 nanometers; and

a phase mask interferometer for using the output beam to produce the Bragg grating in the optical waveguide, the phase mask interferometer comprising:

a phase mask for diffracting rays from the output beam;

a first mirror;

a second mirror; and

an actuator for translating at least one of the first mirror and the second mirror, wherein the first mirror and the second mirror reflect a first ray and a second ray diffracted by the phase mask and cause the first and second rays to interfere with one another, thereby producing a portion of the Bragg grating.

36. An apparatus for producing a Bragg grating in an optical waveguide, the apparatus comprising:

a solid state laser comprising a Ti:sapphire laser medium, wherein the solid state laser emits an output beam having a wavelength in the range of approximately 230 to 250 nanometers; and

a proximity mask for using the output beam to produce the Bragg grating in the optical waveguide.

37. An apparatus for producing a Bragg grating in an optical waveguide, the apparatus comprising:

a solid state laser comprising a Ti:sapphire laser medium, wherein the solid state laser emits an output beam having a wavelength in the range of approximately 230 to 250 nanometers; and

a Lloyd mirror for using the output beam to produce the Bragg grating in the optical waveguide.

38. An apparatus for producing a Bragg grating in an optical waveguide, the apparatus comprising:

a solid state laser comprising a Ti:sapphire laser medium, wherein the solid state laser emits an output beam having a wavelength in the range of approximately 230 to 250 nanometers; and

a prism interferometer for using the output beam to produce the Bragg grating in the optical waveguide.

39. The apparatus of claim I, wherein the prism interferometer comprises:

a prism; and

means for rotating the prism to control a Bragg wavelength of the Bragg grating.

40. An apparatus for producing a Bragg grating in an optical waveguide, the apparatus comprising:

a solid state laser comprising a Ti:sapphire laser medium, wherein the solid state laser emits an output beam having a wavelength in the range of approximately 230 to 250 nanometers; and

phase mask projection means for using the output beam to produce the Bragg grating in the optical waveguide.

41. An apparatus for producing a Bragg grating in an optical waveguide, the apparatus comprising:

a laser medium;

a pump for stimulating the laser medium to emit a fundamental pump beam;

a doubler crystal for doubling the frequency of the fundamental beam to produce a second harmonic pump beam;

a solid state laser comprising a Ti:sapphire laser medium which is pumped by the second harmonic pump beam to emit a fundamental beam;

at least one nonlinear crystal for producing a harmonic beam from the fundamental beam, the harmonic beam having a wavelength in the range of approximately 230 to 250 nanometers;

a processor;

means for actuating wavelength control elements according to control signals from the processor;

means for measuring a wavelength of the harmonic beam and for sending a measurement signal to the processor;

a control for sending a wavelength signal to the processor, the wavelength signal indicating a desired wavelength of the harmonic beam; and

Bragg writing means for using the harmonic beam to produce the Bragg grating in the optical waveguide, wherein the processor controls the rotation means and the temperature control means such that an actual wavelength of the harmonic beam is within a predetermined number of nanometers of the desired wavelength.

42. The apparatus of claim 41, wherein the wavelength control elements are selected from the group consisting of gratings, prisms, etalons and birefringent filters.